~~350/1~~ **Nikon** ~~350~~ 359/371

Polarizing Microscope Model POH-2

NIKON POLARIZING MIC

Nikon perfection In precision polarization performance

Many minerals, rocks, metals, fibers and chemicals, as well as animal and plant tissues, have intrinsic birefringent properties which only show up under polarized light. The polarizing microscope, making use of these properties, magnifies minute details of these materials for distinguishing the nature of their component parts. Long used in petrological and mineralogical studies of the optical properties of speciments, the polarizing microscope is now extensively used in the chemical, plastics, metal, synthetic fiber and food industries, as well as in medicine, biology and pharmacology. The Nikon Polarizing Microscope Model POH-2 fills all the requirements for polarization studies in these fields. It provides the following features:

ROSCOPE MODEL POH-2

Extra-Long Range of Stage Elevation and Focusing

The stage, together with substage, can be lowered 71mm for a distance of 104.6mm from the objective shoulder to the stage surface to accommodate a universal stage with hemispheres. The stage can, of course, be clamped at any intermediate position from which coarse or fine focusing can be conducted within a range of 38mm. Fine focusing is calibrated in two-micron increments and is operated by an incorporated differential gear train which serves the whole range of focusing without interruption.

Interchangeable Single and Multiple Revolving Nosepieces

Single-Objective Nosepiece

A strain-free objective, which is screwed into a centerable clutch and inserted into the dovetail of the single mount adapter, is available. It is furnished with a locking bar which assures easy interchange of objectives. The single-mount adapter is fastened securely to the dovetail on the microscope arm by a clamping lever.

Revolving Objective Nosepiece

A four-place nosepiece interchanges strain-free objectives easily and in succession from one magnification to another. The nosepiece is slid into the dovetail on the microscope arm and is locked in position. Each objective, after being screwed into the lens receptacle, can be centered to the microscope optical axis by manipulating two screws inserted into two holes on each side of the objective receptacles on the nosepiece assembly.

Built-In Illuminator Base

A tungsten illuminator is built into the microscope base. A precentered 6v 15w flat filament bulb is used as light source. It is supplied with a step-down transformer with a main switch, pilot lamp and variable voltage control. The knurled ring on the top surface of the microscope base, when rotated, faces the internal reflecting mirror in the opposite direction so that an external light source, such as a sodium vapor lamp, may be directed through the front opening when precise measurement of minute retardations is to be carried out.

Easy Interchange of Eyepiece Tubes with Intermediate Tube

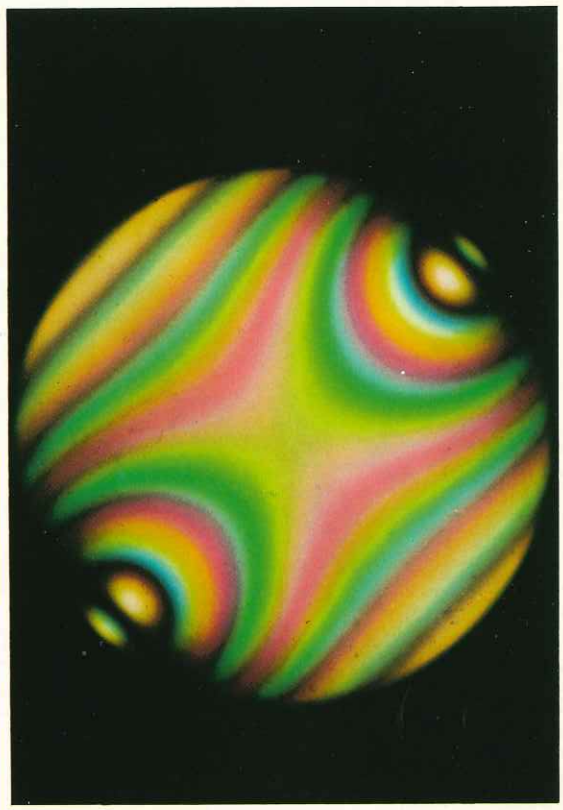
The intermediate tube mounted on top of the microscope arm contains (1) a rotating turret with three holes, one for mounting a focusable and centerable Bertrand lens for conoscopic observation, one for a magnifier for the Babinet compensator, and one for orthoscopic observation; (2) a push-pull filter analyzer, rotatable 180° and reading to 6 minutes with vernier; and (3) a slide also with three holes, one for mounting a 1/4-wavelength plate (λ = 589.3mμ), one for a sensitive tint plate (λ = 530mμ) and one empty; this slide can be interchanged with a Sénarmont compensator. Because these elements are contained in the intermediate tube, the eyepiece tubes (30° inclined monocular, vertical photo-tube or 30° inclined trinocular) can be interchanged without any deterioration of optical performance.

Graduated, Circular Rotatable Stage (ball bearing)

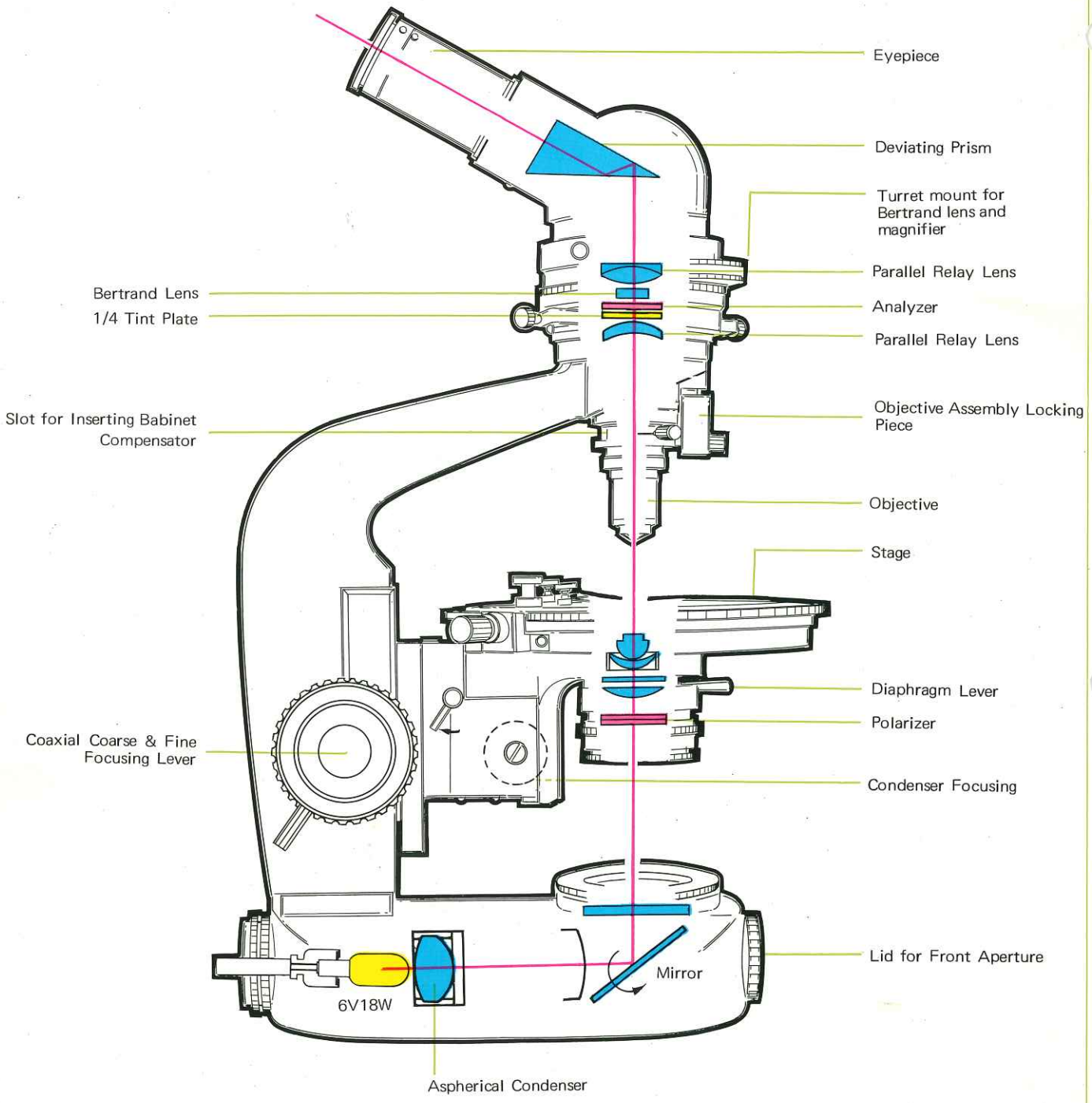
150mm in diameter, 360° rotatable. The goniometer is divided into 1-degree increments and reads to 6 minutes with either of two verniers placed 90° apart, with click stops at each 45° division. The position from which the 45° division is counted can be set at any optional point with a lever on the side of the stage. A clamping knob and two stage clips are provided. On the stage surface there are two screw-threaded and six straight holes for attaching a universal stage, an attachable mechanical stage or stage clips.

Epi (Surface)-Illuminator

The epi-illuminator can be attached between the dovetail on the microscope arm and the single-nosepiece assembly. It has a 1.2X magnification factor and is used for examination of opaque specimens. The filter polarizer is 90° rotatable with an index mark at the 45° position. A 6v 15w precentered bulb is used. A built-in, push-pull auxiliary lens and field and aperture diaphragms assure optimum illumination at all magnifications. When the mirror holder is pulled out of the optical path, the microscope can be used for normal transmitted light observations.



Details of the Instrument



Intermediate Tube

Single Mount Adapter

Condenser Clutch

Eyepiece Adapter

Specifications

Total Magnification 20X - 1000X (Attainable range with standard lens series. When epi-illuminator is used: 30X - 1200X, when trinocular tube F is used: 25X - 1250X)

Mechanical Tube Length 160mm

Objective Nosepieces and Objectives Single-objective nosepiece or four-objective revolving nosepiece readily interchangeable and clamped into position.

■Single-Objective Nosepiece: Composed of centerable clutch and single-mount adapter with objective assembly locking piece and a slot to insert a Babinet compensator at a 45°angle. ■Four-Objective Revolving Nosepiece: Directly slid into microscope arm dovetail. Each objective is individually centerable. (Note: When this nosepiece is used, the Babinet compensator cannot be used simultaneously.)

OBJECTIVES

Type	Individual Magnification	Numerical Aperture	Focal Length	Free-Working Distance
Achromatic Dry	P* 4X	0.10	28.3mm	9.50mm
	P* 10X	0.25	14.8mm	7.10mm
	P* 20X	0.40	7.5mm	5.70mm
	P* 40X	0.65	4.3mm	0.54mm †
Oil-immersion	P* 100X	1.25	1.8mm	0.16mm †
Plan Achromatic Dry	P Plan 4X	0.10	29.5mm	18.20mm
	P Plan 10X	0.25	15.6mm	7.00mm
	P Plan 40X	0.65	4.0mm	0.24mm †
Oil-immersion	P Plan 100X	1.30	1.6mm	0.12mm †

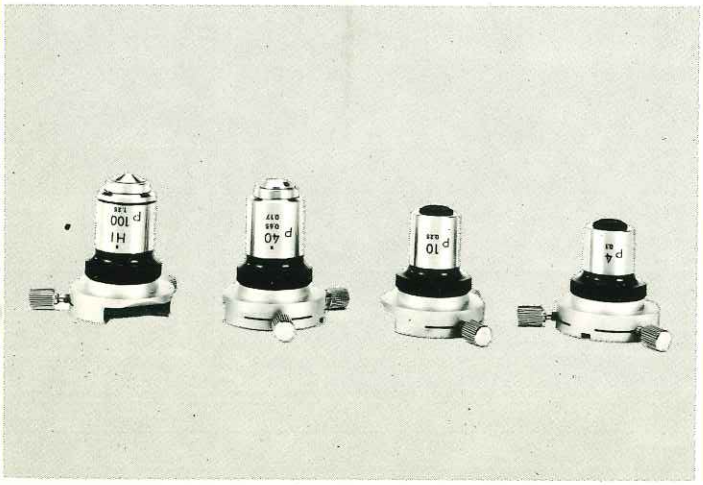
For opaque objects, epi-illuminator use

Achromatic Dry	P M 5X	0.10	25.0mm	15.00mm
	P M 10X	0.25	14.8mm	7.10mm
	P M 40X	0.65	4.3mm	0.52mm †
Oil-immersion	P M 100X	1.25	1.8mm	0.16mm †

For use with universal stage and hemispheres

Achromatic (Oil-immersion)	U** 5X	0.10	30.9mm	5.30mm
	U** 10X	0.22	22.7mm	2.90mm
	U** 20X	0.33	11.8mm	1.10mm

* Strain-free objective lens ** Universal stage objective lens † Spring-loaded



Eyepiece Tubes and Eyepieces Monocular or trinocular eyepiece tube, interchangeable. Vertical photo-tube is also available.
Inclined Monocular Eyepiece Tube: 30° inclined, 360° rotatable. Large diameter eyepieces 5X, 7X and 10X allow wide field of view. The eyepiece has a diopter adjustment collar on top to permit internal crossline or scale to be sharply focused.

Type	Individual Magnification	Focal Length	Field No.	Reticle
Wide-field, Huygenian	5X	50.0mm	28mm	Crossline
	7X	35.8mm	25mm	1mm scale, 100 div.
	10X	25.0mm	22mm	Crossline

The eyepiece has a locating stud on its side so that it seats snugly into the eyepiece tube in relation to either one of two matching notches, where the orientation of the crossline is such that the line is vertical or parallel or alternately 45° to the vibration plane of the polarized light when the polarizer and the analyzer are set to zero (crossed Nicols). The 7X eyepiece is designed to be used for measuring purposes, with a reticle-engraved scale with 0.1mm divisions.

Trinocular Eyepiece Tube With magnification factor 1.25X. Observation binoculars are inclined 30°, photo-tube upright. Has provision for adjusting the discrepancy between photo-tube and observation binocular, and has interpupillary distance adjustment from 54mm to 74mm. With its built-in sliding prism system, the light transmission can be alternated in the following two ways:

(a) To blank out the binoculars by sliding the deviating prism out of the optical path and transmit 100% of the light directly to the vertical monocular tube.

(b) To blank out the vertical photo-tube by sliding the prism into the optical path and transmit 100% of the light to the binoculars. This permits the observation binocular or vertical photo-tube to make full use of the available light independently. The outer diameter of the eyepiece to be used should be the normal 23.2mm. Pairs of HK 5X and HKW 10X eyepieces are available on order, with one of each pair provided with a crossline reticle and a locating stud on its side to permit insertion of the binocular into the tube, with the wall notched for orientation. For photomicrography, a set of 5X and 10X photo-eyepieces, which serve as relay/projection lenses, and a DHKW 10X finder eyepiece with 5X, 10X and 15X reticles for framing and focusing are available on order.

Type	Individual Magnification	Focal Length	Field No.	Reticle
High eyepoint compensating	5X	50mm	21.0mm	Crossline
High eyepoint, compensating, wide-field	10X	25mm	18.0mm	Crossline

Remarks: To change the crossline reticle to the 1mm-increment 100-division scale, a micrometer holder sleeve is supplied separately.

Depolarizer
Screwed into the bottom of the "F" trinocular tube. Used for correcting chromatic difference between the left and right eyepieces which arises when the analizer is taken off the optical path.

Graduated, Circular Rotatable Stage (ball bearing) 150mm diameter, 360° rotatable. Goniometer is divided into one-degree increments and reads to 6 minutes with either of two verniers, 90° apart. Click stops are provided at every 45° position and can be set to work from any point with the release lever. Has rotation locking clamp and two stage clips. Stage surface has two screw-threaded and six straight holes for mounting a universal stage, an attachable mechanical stage or slide clips. The stage with substage construction can be lowered 71mm from the standard position and clamped at any intermediate position, from which coarse and fine focusing can be conducted.

Attachable Mechanical Stage Range of travel, 25mm x 25mm; reading to 0.1mm by vernier.

Coarse Focusing Focusing knobs are located on both sides of the instrument. Vertical motion of stage by means of rack and pinion. Range, 38mm. The torque of coarse-focusing control can be adjusted to suit user's preference by a large-diameter, scalloped knob found inside the right-hand focusing knob. A clamping lever between the coarse-focusing knob and the torque-control ring presets the limit of stage motion and prevents inadvertent physical contact between the objective and the specimen slide; it can also be preset to stop at any desired in-focus position.

Fine Focusing Coaxial with coarse-focusing knob. With differential gear trains, covers whole coarse-focusing range. Increments, 0.002mm.

Analyzer Mounted in the intermediate tube. Can be brought into and out of the optical path and is rotatable 180°, with a minimum reading of 6 minutes by vernier. The analyzer mount has two holes, by means of which, when a rod is connected to the polarizer, both the polarizer and analyzer can be rotated in synchronization.

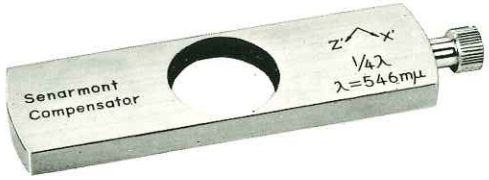
Polarizer The polarizer is inserted from below into the condenser barrel and can be rotated 360°. With index marks at 90°, 180° and 270°.

Bertrand Lens Centerable and focusable. Mounted on a turret in the intermediate tube and can be brought into and out of the optical path. For observation of conoscopic figures.

Condenser Consists of three lens elements, N.A. 0.65 corresponding to a conoscopic angle of 82°. When the condenser is oil-immersed, the numerical aperture becomes 1.0. The top element of the condenser can be swung out of the optical path for orthoscopic observation and used with a universal stage, in which case the remaining two lower lens elements are used and the numerical aperture is lowered to 0.25. An iris diaphragm is provided. The condenser is mounted on a precentered clutch and is slid into the dovetail of the substage. A clutch is also available as an accessory to be used for mounting another condenser, e.g., phase contrast for measurement of refractive index of a specimen.

1/4-Wavelength Retardation Plate and Sensitive Tint Plate A 1/4-wavelength retardation plate (λ=589.3mμ) and a tint plate (λ=530mμ) are mounted on a slider which is inserted into a slot in the intermediate tube. For measuring crystal axis, positive or negative direction, weak birefringence, etc.

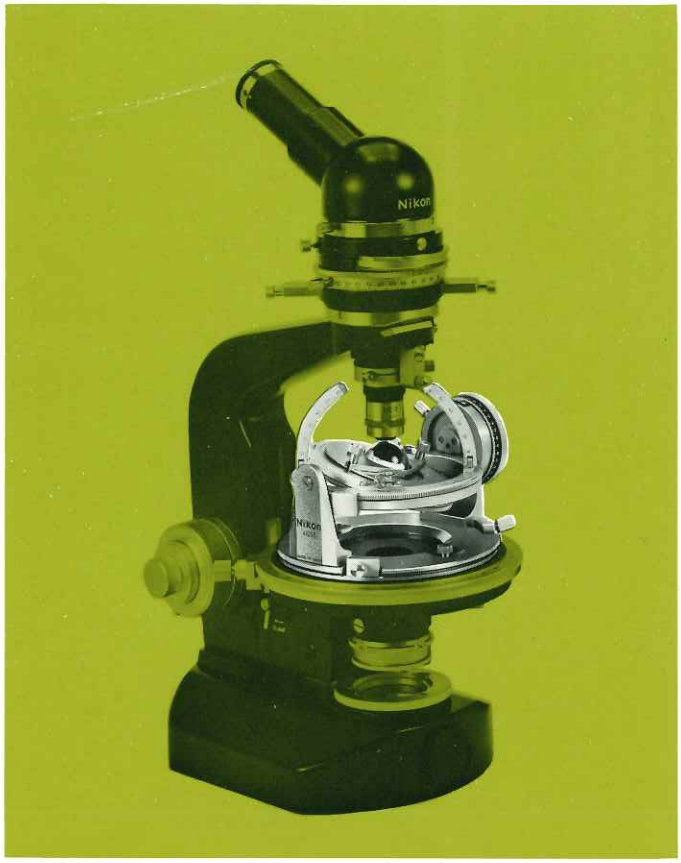
Sénarmont Compensator A special 1/4-wavelength retardation plate (λ=546.1mμ). Mounted on a slider which replaces the regular 1/4-wavelength retardation plate and tint plate slider.



Microscope Base With Built-In Illuminator Houses a tungsten illuminator as light source, using a precentered 6v 15w bulb. Supplied with a step-down transformer provided with a main switch, pilot lamp and variable voltage control. When the knurled ring on the top surface of the microscope base is rotated to the red index mark in the opposite direction, it revolves an internal reflecting mirror to the front aperture so that an external light source, e.g., a monochromatic source, such as a sodium vapor lamp, may be employed for measurement of minute retardations. The ring accepts inlaid 45mm-diameter filters.

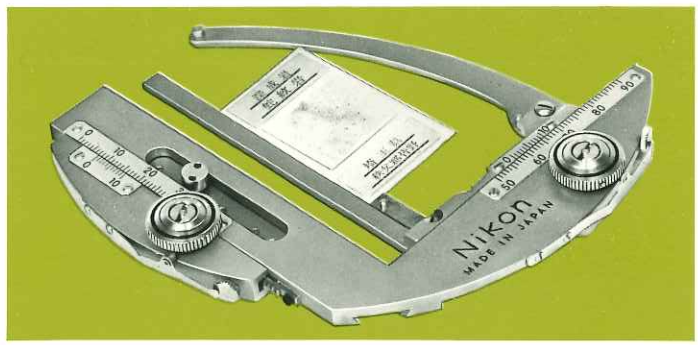
Special Accessories

Universal Stage Four-axis type. The stage is mounted on top of the graduated, circular rotatable stage by two thumb screws and permits tilting of a thin specimen at any angle to the optical axis of the microscope for measuring the optical structure of a birefringent crystal specimen. Provided with two centering screws. Supplied with three pairs of 13.5mm-diameter hemispheres with ND=1.516, ND=1.556 and ND=1.649. Objectives to be used with the hemispheres: U 5X (N.A. 0.1, W.D. 5.3mm), U 10X (N.A. 0.22, W.D. 2.9mm) and U 20X (N.A. 0.33, W.D. 1.1mm).

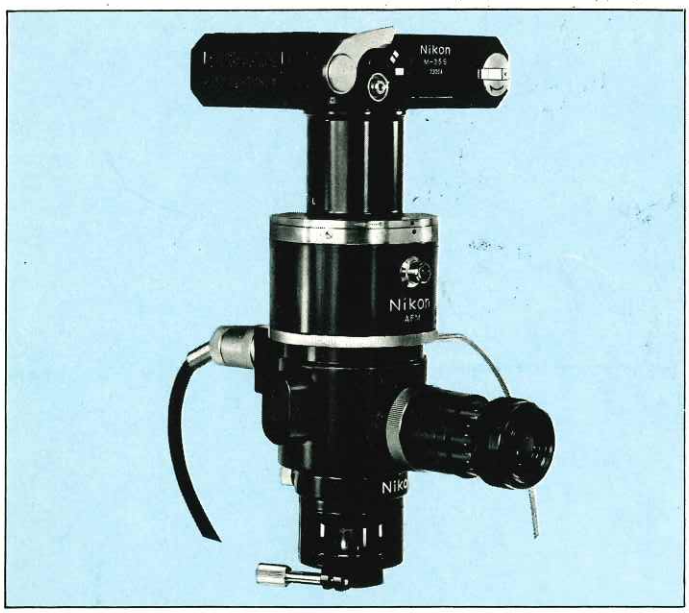


Epi-Illuminator Attached between the dovetail of the microscope arm and the single-objective nosepiece. Has 1.2X magnification factor and is used for examination of opaque specimens. Polarizer is 90° rotatable. Incorporates a precentered 6v 15w bulb, collector lens, aperture diaphragm, field diaphragm and half-reflecting mirror. When the half-reflecting mirror is pulled out of the optical path, the microscope can be used for transmitted light observations. The openings of the two diaphragms are adjusted by turning external rings. Use of P M 5X, P M 10X, P M 40X and P M 100X objectives is recommended.

Attachable Mechanical Stage Type D Designed mainly for use with Type G stage. Has a point-counter with 0.2mm or 0.3mm increments for measuring the exact range of the specimen's movement. Range of travel is 30mm x 30mm, graduated in 0.1mm increments on the vernier.



Babinet Compensator Consists of two quartz wedges with vibration planes set crossed to each other; one wedge is fastened, the other is slid to determine the retardation of a thin specimen. The scale graduation is read through the magnifier mounted on the turret on which the Bertrand lens is also attached. Range of measurement, −1 to +3. To be inserted into the slot of the single mount adapter at 45° from the rear.



■ Photomicrographic Attachment

Model AFM with dark box M-35S

Automatic Microflex attachment with built-in transistorized shutter. Permits automatic release of correct exposure time to simplify exposure determination in photomicrography. After exposure controls are set, simply focus and push the cable release; the shutter operates automatically from 1/100-second to 10-minute speed range with no loss of a single picture frame.

Two other photomicrographic attachments, the standard Model PFM and the semi-automatic microflex Model EFM, are also available. A variety of accessories for various types of film formats (roll, sheet, plate, Polaroid, etc.) can also be ordered. For details, refer to brochure on Nikon photo-/cinemicrographic equipment.

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The model in this catalogue represents the design of our instrument at the time of printing. The design and specifications are subject to change due to further improvements.

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